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and.

storing in the memory, based upon the electronic signals, corresponding data related to the motion, the data including data points related to positions of the ball and enabling extrapolation to generate lines representing the motion of the ball.

REMARKS

In response to the Office Action dated July 31, 2002, Applicant has amended claims 1 and 11. Claims 1-20 are pending. Reconsideration and allowance of all pending claims are respectfully requested.

Claims 1-20 were rejected under 35 U.S.C. § 102 as anticipated by U.S. Patent No. 6,188,392 (O'Connor patent). Independent claims 1 and 11 have been amended to recite that the stored data includes "data points related to positions of the ball and enabling extrapolation to generate lines representing the motion of the ball." This feature is supported by at least Figures 1, 4, and 5, and the accompanying text in the present application as filed. In particular, the present application as filed states that "[b]y repeatedly retrieving data points, computer 14 may extrapolate them to generate lines as written by a user. Various algorithms can be used to create smooth lines from the line segments; for example, data extrapolation techniques and algorithms are known in the art for creating lines from data points." (Page 6, lines 14-17.)

Applicant respectfully submits that the O'Connor patent does not disclose or suggest at least this feature. The pen of the O'Connor patent records acceleration and pressure information from the pen tip. However, the O'Connor patent provides no disclosure or suggestion of Applicant's claimed method of recording data points that can be extrapolated to generate lines. Rather, the pen of the O'Connor patent records acceleration information from acceleration sensors, and that information is digitized and stored. The patent states that the acceleration information can then be processed to determine speed and position of the pen tip. "Such processing may be based on well established mathematical formulae, well known in the art, from which one may determine, based on acceleration, speed, position, etc." (O'Connor patent, col. 4, lines 37-40.)

Therefore, the O'Connor patent teaches using acceleration information to determine position of the pen tip. It does not disclose or suggest using data points relating to pen tip position capable of extrapolation to create lines representing lines drawn by the pen ball. In particular, acceleration information is different from data points related to position information. Applicant's claimed technique simply records data points relating to position information for later extrapolation. Therefore, Applicant respectfully submits that claims 1 and 11 are patentably distinguishable over the O'Connor patent.

Applicant respectfully submits that dependent claims 2-10 and 12-20 are patentable for the same reasons as provided for corresponding base claims 1 and 11, and because they define additional combinations of elements not disclosed in or suggested by the cited references.

Accordingly, Applicant respectfully submits that the pending claims are in condition for allowance. Reconsideration and allowance of all pending claims are respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached pages are captioned "**Version with markings to show changes made.**" Also attached is a clean copy of the pending claims, which are captioned "**Pending Claims.**"

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Respectfully submitted,



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Version with Markings to Show Changes Made

Claims 1 and 11 have been amended as follows:

1. (Amended) An electronic pen for recording motion data relating to use of the pen, comprising:

a pen body;

a ball mounted in the pen body;

a sensor in the pen body, located proximate the ball, for detecting motion of the ball and converting the motion into corresponding electronic signals; and

a memory in the pen body, electronically coupled to the sensor, for receiving the electronic signals and storing corresponding data related to the motion, the data including data points related to positions of the ball and enabling extrapolation to generate lines representing the motion of the ball.

11. (Amended) A method for recording motion data relating to use of a pen having a pen body, a ball mounted in the pen body, a memory, and a sensor located proximate the ball, comprising:

detecting motion of the ball using the sensor;

converting the motion into corresponding electronic signals;

receiving the electronic signals; and

storing in the memory, based upon the electronic signals, corresponding data related to the motion, the data including data points related to positions of the ball and enabling extrapolation to generate lines representing the motion of the ball.

Pending Claims

1. (Amended) An electronic pen for recording motion data relating to use of the pen, comprising:
 - a pen body;
 - a ball mounted in the pen body;
 - a sensor in the pen body, located proximate the ball, for detecting motion of the ball and converting the motion into corresponding electronic signals; and
 - a memory in the pen body, electronically coupled to the sensor, for receiving the electronic signals and storing corresponding data related to the motion, the data including data points related to positions of the ball and enabling extrapolation to generate lines representing the motion of the ball.
2. The electronic pen of claim 1, further including a removeable ink cartridge, disposed within the pen body, for applying ink to the ball.
3. The electronic pen of claim 1, further including a port, located on the pen body and electronically coupled to the memory, for use in transferring the data from the memory to an external device.
4. The electronic pen of claim 1, further including a circuit, electronically coupled to the sensor and the memory, for sampling the sensor at a particular rate and controlling transmission of a sampled electronic signal from the sensor to the memory.
5. The electronic pen of claim 1, further including a module for receiving the data and for converting the data into a visual representation of the motion of the ball.
6. The electronic pen of claim 5, further including a module for storing the visual representation.
7. The electronic pen of claim 1 wherein the sensor includes dual sensors for detecting directions from which orthogonal ball motions can be reconstructed.
8. The electronic pen of claim 7 wherein the memory stores as the data coordinates representing the directions from which the orthogonal ball motions can be reconstructed.
9. The electronic pen of claim 1 wherein the memory stores an indication of a set of the motion data and a default location for a start of the corresponding motion.
10. The electronic pen of claim 1 wherein the memory comprises an atomic resolution storage memory.
11. (Amended) A method for recording motion data relating to use of a pen having a pen body, a ball mounted in the pen body, a memory, and a sensor located proximate the ball, comprising:

detecting motion of the ball using the sensor;
converting the motion into corresponding electronic signals;
receiving the electronic signals; and
storing in the memory, based upon the electronic signals, corresponding data related to the motion, the data including data points related to positions of the ball and enabling extrapolation to generate lines representing the motion of the ball.

12. The method of claim 11, further including providing a removeable ink cartridge, disposed within the pen body, for applying ink to the ball.

13. The method of claim 11, further including electronically transferring the data from the memory to an external device.

14. The method of claim 11, further including:
sampling the sensor at a particular rate; and
controlling transmission of a sampled electronic signal from the sensor to the memory.

15. The method of claim 11, further including:
receiving the data;
converting the data into a visual representation of the motion of the ball.

16. The method of claim 15, further including storing the visual representation.

17. The method of claim 11 wherein the detecting step includes using dual sensors for detecting directions from which orthogonal ball motions can be reconstructed.

18. The method of claim 17 wherein the storing step includes storing as the data coordinates representing the directions from which the orthogonal ball motions can be reconstructed.

19. The method of claim 11 wherein the storing step includes storing an indication of a set of the motion data and a default location for a start of the corresponding motion.

20. The method of claim 11 wherein storing step includes using an atomic resolution storage memory for storing the data.